

REMARKS

The above-identified patent application has been amended and Applicants respectfully request the Examiner to reconsider and again examine the claims as amended.

Claims 1-38 are pending in the application. Claims 1-38 are rejected. Claims 2-4, 9-14, and 22 are amended herein. Claims 1, 19-21, 23, and 35-37 are cancelled herein without prejudice.

Applicant's attorney would like to thank Examiner Woods for the courtesy extended to Applicant's attorney during the telephone interview on December 15, 2005. Rejections of claims were discussed and clarified by the Examiner. The Examiner pointed out various claim terms that he would like to see amended, notably, use of the term "absolute," and use of the term "substantially." The Examiner also pointed out use of the connector "and" versus the connector "or" when following the phrase "at least one of," as interpreted in several recent cases. Applicants have made the amendments suggested by the Examiner. In accordance with further suggestions by the Examiner, and in order to move the case forward, Applicants have also canceled, without prejudice, the word "color" from the claims. However, Applicants reserve the right to pursue the aspects of color in a new continuing patent application.

The Rejections under 35 U.S.C. §103(a)

The Examiner rejects Claims 1-38 under 35 U.S.C. §103(a) as being unpatentable over Hancock (U.S. Patent number 5,179,377) in view of Beasley (U.S. Patent number 5,845,874) and further in view of Masumoto (U.S. Patent number 5,210,540).

Independent Claim 1 is canceled herein without prejudice and claims formerly depending to Claim 1 are amended to depend from independent Claim 9. Independent Claims 9-13 each set forth systems and methods for conveying to a user an altitude of an object relative to a geographic reference, by way of a characteristic of an icon representing the object on a radar

display, wherein the icon characteristic changes in a monotonic fashion in relation to the altitude. The characteristic of the icon which changes is recited in Claims 9-13 as size, intensity, grayscale, or shape.

The Examiner recognizes that Hancock does not disclose the idea of representing an altitude of the object relative to a geographic reference. The Examiner also recognizes that Hancock neither describes nor suggests the idea of changing a characteristic of an icon in response to changing an altitude of an object relative to a geographic reference. The Examiner relies upon Masumoto to teach the idea of generating altitude data of an object. The Examiner relies upon Beasley to teach the idea of changing an icon characteristic in response to changing of absolute altitude of an object.

With regard to Beasley, the Examiner concludes that “[i]t would have been obvious to one skilled in the art to incorporate the teaching of Beasley into the teaching of Hancock [i.e. adding the representation of absolute altitude of aircrafts in display]... .” With regard to Masumoto, the Examiner concludes that “[i]t would have been obvious to one skilled in the art to incorporate the teaching of Masumoto into the teaching of Hancock [i.e. utilizing of absolute altitude data of the object rather than using of differential altitudes data]... .”

Hancock, at column 4, lines 9-10, in describing Fig. 2, discloses a traffic situation awareness display on a craft (abstract), which is described to be an aircraft and for which “...the size of aircraft symbol 42, 44 or 50 has a size related to altitude differential from own aircraft represented by symbol 22... .” Applicants understand Hancock to describe, for example, in conjunction with Fig. 2, a display for which icons associated with aircraft displaced a particular amount both above and below own aircraft are shown having the same size. Thus, Hancock provides a display, which allows a user to most easily visualize altitude conflicts with his (or her) own aircraft. With the Hancock display, however, a user cannot tell from the icon whether an aircraft (or other object) is above or below the user's aircraft. This is because an icon that represents an aircraft 1000 feet below the user's aircraft is the same size as an icon that represents an aircraft 1000 feet above the user's aircraft.

The Examiner relies upon Beasley to teach a color characteristic of a display icon that changes in response to an altitude. Beasley describes an air traffic control system having visual representations of simulated wake vortices that "...allows the user to direct aircraft around potentially harmful wake vortices." (abstract) Beasley also describes in relation to FIGS. 4 and 5, at column 5, lines 38-43:

Conventional air traffic control displays and radar displays depict a fixed "god's eye" view of airspace 470. In other words, the viewer looks down through airspace 470 onto runway 410. These types of displays typically include altitude information in the form of a number accompanying an image or blip of the aircraft being displayed. Other displays use a color of the aircraft to indicate altitude information. However, numerical or color altitude information displayed as such do not enable the viewer to visualize the relative distances in three dimensions of the various displayed aircraft.

As described above, Applicants have removed the word "color" from the claims. Applicants submit that the combination of Hancock, Beasley, and Masumoto would not provide the claimed changes of icon size, grayscale, intensity, or shape in relation to altitude relative to a geographic reference.

However, with regard to color, Applicants submit that, even if the color representations described as conventional by Beasley were combined into the invention of Hancock, still the claimed invention would not result. A combination of Hancock and Beasley would result in the system of Hancock, wherein the color (as in Beasley) of aircraft symbols shown on a radar display would have a color related to altitude differential (as in Hancock) from own aircraft. Thus, the combination of Hancock and Beasley would still not provide the icon characteristic representative of altitude relative to a geographic reference as claimed.

Applicants submit that Masumoto fails to overcome the above deficiencies in Hancock and Beasley. Masumoto teaches a global positioning system that generates "present position" data, which can include "absolute altitude" data, the meaning of which in Masumoto Applicants understand to be an altitude above sea level. Masumoto does not describe or suggest a means for display of the altitude data. Merely having the altitude data, without a stated means for display,

Applicants understand that the altitude data display of Masumoto to be conventional, i.e., a numerical display. Applicants submit that Masumoto provides no more guidance to one of ordinary skill in the art faced with the problems faced by the Applicants, than guidance provided by a conventional air traffic control system, which Applicants seek to improve. As stated in the Background section of the present application, some conventional air traffic control systems display altitude of each aircraft as a respective number.

Applicants submit that, even if the altitude data described by Masumoto were combined with the invention of Hancock and Beasley, still the claimed invention would not result.

Applicants submit that a combination of Hancock, Beasley, and Masumoto would result in the system of Hancock, wherein the differential altitude of aircraft symbols shown on a radar display would be displayed as colors as in Beasley, with an associated number as in Masumoto. The combination of Hancock, Beasley, and Masumoto would not provide the icon characteristic representative of altitude relative to a geographic reference as claimed. Also, Applicants submit that the combination of Hancock, Beasley, and Masumoto would not provide the claimed combinations of changes of icon size, grayscale, intensity, or shape representative of altitude relative to a geographic reference as claimed.

Furthermore, As the Examiner is aware, and as found in MPEP §2143.01, in order to establish a prima facie case of obviousness "...[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious."

Applicants submit that a further different combination of Hancock, Beasley, and Masumoto, which does not relate icon characteristics (e.g., color as in Beasley) to differential altitudes, but which instead relates icon characteristics (e.g., color as in Beasley) of aircraft icons to altitude relative to sea level, for example, altitude relative to sea level as described in Masumoto, alters the fundamental principle of operation of Hancock, which is to display a representation of differential altitude to the operator of an aircraft in order to provide a display

that can most easily show aircraft altitude conflicts. Applicants submit (as discussed above) that if the display of Hancock were modified to show altitude relative to a geographic reference as suggested by the Examiner, it would be very difficult, if not impossible, for an operator to identify aircraft altitude conflicts. Therefore, Applicants submit that the above-described combination of Hancock, Beasley, and Masumoto, which would relate icon characteristics (e.g., color as in Beasley) to altitude relative to sea level, for example, altitude relative to sea level as described in Masumoto, changes the principle of operation of Hancock, and is not a proper combination of references. As described above, Applicants again point out that the word "color" has been cancelled from the claims.

Furthermore, as the Examiner is aware, and as found in MPEP §2142, in order to establish a prima facie case of obviousness "...there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings." Applicants respectfully submit that the Examiner has not met this burden in order to establish prima facie obviousness.

Hancock teaches a particular way in which aircraft differential altitude can be represented by way of aircraft icon size on a radar display. Applicants submit that, already having the representation of aircraft differential altitude by way of aircraft icon size, Hancock would not be motivated to search for another different (and potentially more complex) way (e.g., color display as in Beasley) to represent aircraft differential altitude on the radar display as would be required by a combination of Hancock with Beasley and/or with Masumoto.

Applicants also submit that Hancock would not be motivated to represent the claimed altitude relative to a geographic reference on a radar display as suggested by the Examiner, since that is not the display representation that he has selected to be the best solution to the problem he attempts to solve. Hancock describes the problem he attempts to solve, for example, at column 1, lines 50-53, where Hancock states "...pilots often find it time consuming and

confusing to visually acquire and process dynamic changes in the air traffic situation under moderate or high cockpit work load conditions.”

At column 1, lines 54-66, Hancock further states that:

Attempts of the related art to solve the problems of indirect visualization of conventional displays have focused on basic symbology refinement for the two-dimensional TCAS display format. Efforts have been made to reduce confusion and misinterpretation by modifying the symbols. For example, all the numeric codes were initially displayed above the aircraft symbol with a "plus" or "minus" sign to indicate relative elevation. The most current baseline TCAS display presents the numerics either above or below the symbol for conceptual compatibility. No effort has been made to explore other innovative approaches or to empirically validate current design concepts. [emphasis added]

As described above, Hancock specifically searches for a way to display differential altitude to an aircraft operator in order to provide a display that can most easily show aircraft altitude conflicts. Applicants yet again submit that if the display of Hancock were modified to shown altitude relative to a geographic reference as claimed in the present application, it would be very difficult, if not impossible, for an operator to identify aircraft altitude conflicts. Therefore, Hancock teaches away from a combination with Beasley and/or Masumoto that would provide a display representative of “absolute altitude” as in Masumoto (i.e., altitude relative to sea level) for his application.

In view of the above, Applicants submit that independent Claims 9-13 are patentably distinct over Hancock, whether taken alone or in combination with Beasley and Masumoto.

Claim 11 is further patentably distinct over the combination cited by the Examiner since the references neither describe nor suggest that the characteristic of the icon that changes is two or more of size, grayscale, intensity, or shape. Applicants can find no mention in any of the references of a changing icon grayscale, shape, or intensity as called for in Claim 11.

Claims 2-8 and 14-18 depend from and thus include the limitations of Claim 9. Claims 22 and 24 depend from and thus include the limitations of Claim 12. Claims 25-34 and 38 depend from and thus include the limitations of Claim 13. Thus, Applicants submit that Claims 2-8, 14-18, 22, 24, 25-35, and 38 are patentably distinct over the cited references at least for the reasons discussed above in conjunction with Claims 9-13. Claims 19-21, 23, and 35-37 are canceled herein without prejudice and will not be discussed.

Applicants submit that Claim 5 is further patentably distinct over Hancock, whether taken alone or in combination with Beasley and Masumoto, since the cited references neither describe nor suggest "... the size of the icon is selected from a limited number of discriminably different sizes," as set forth in Claim 5. With regard to Claim 5, the Examiner asserts, "...Hancock discloses that the size of the icon is selected from a limited number of discriminably different sizes (See Fig 1-2)." However, Applicants submit that the icons shown in Figs. 1 and 2 have sizes that are a continuous function of altitude (i.e., have an essentially limitless number of sizes) and not the claimed limited number of sizes. Applicants note that in regard to Claim 6, the Examiner states that "Hancock discloses a "...continuously variable relationship between the icon size ant the third coordinate z. (See Fig 1-2)," which apparently agrees with the Applicants position regarding Claim 5.

Applicants submit that Claim 7 is further patentably distinct over Hancock, whether taken alone or in combination with Beasley and Masumoto, since the cited references neither describe nor suggest "... the size of the icon is directly correlated with the third coordinate z, such that a larger value of the third coordinate z correlates with a larger size of the icon," as set forth in Claim 7. Applicants respectfully remind the Examiner that "the third coordinate z represents an altitude of the object relative to a geographic reference," as set forth in Claim 9.

Similarly, Applicants submit that Claim 8 is further patentably distinct over Hancock, whether taken alone or in combination with Beasley and Masumoto, since the cited references neither describe nor suggest "... the size of the icon is inversely correlated with the third

coordinate z, such that a larger value of the third coordinate *z* correlates with a smaller size of the icon," as set forth in Claim 8.

With respect to Claims 14, 15, 16, 17, 18, 22, 30, 31, 32, 33, 34, and 38, which recite that the characteristic of the icon that changes is intensity or shape, the Examiner has apparently not found the Applicant's arguments set forth in a Response filed on August 29, 2005 to be persuasive.

With respect to Claims 14, 15, 16, 17, 18, 22, 30, 31, 32, 33, 34, and 38, Applicant have already submitted that neither Hancock, Beasley, nor Masumoto describe or suggest that the characteristic of the icon that changes is intensity or shape. Applicants can find no mention in any of the references of a changing icon shape or intensity. Applicant's reasoning on these points has already been made of record and Applicants will not repeat them again here.

For substantially the same reasons discussed above in conjunction with Claim 5, Applicants submit that Claim 26 is further patentably distinct over Hancock, whether taken alone or in combination with Beasley and Masumoto, since the cited references neither describe nor suggest "...the size of the icon is selected from a limited number of discriminably different sizes," as set forth in Claim 26.

For substantially the same reasons discussed above in conjunction with Claim 7, Applicants submit that Claim 28 is further patentably distinct over Hancock, whether taken alone or in combination with Beasley and Masumoto, since the cited references neither describe nor suggest "...correlating includes a direct relationship between the size of the icon and the third coordinate z, such that a larger value of the third coordinate *z* results in a larger size of the icon," as set forth in Claim 28. Applicants respectfully remind the Examiner that the third coordinate *z* represents an altitude relative to a geographic reference.

Similarly, Applicants submit that Claim 29 is further patentably distinct over Hancock, whether taken alone or in combination with Beasley and Masumoto, since the cited references

neither describe nor suggest "...said correlating includes an inverse relationship between the size of the icon and the third coordinate z, such that a larger value of the third coordinate z results in a smaller size of the icon," as set forth in Claim 29.

Accordingly, Applicants submit that the rejection of Claims 1-38 under 35 U.S.C. §103(a) should be removed.

In view of the above Remarks, Applicants submit that the claims and the entire case are in condition for allowance and should be sent to issue and such action is respectfully requested.

The Examiner is respectfully invited to telephone the undersigning attorney if there are any questions regarding this Response or this application.

The Assistant Commissioner is hereby authorized to charge payment of any additional fees associated with this communication or credit any overpayment to Deposit Account No. 500845, including but not limited to, any charges for extensions of time under 37 C.F.R. §1.136.

Respectfully submitted,

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